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Commission internationale de l'Enseignement mathématique.

LES TENDANCES ACTUELLES DE L'ENSEIGNEMENT MATHÉMATIQUE

DANS LES DIVERS PAYS[1]

RAPPORTS DES DÉLÉGATIONS NATIONALES

(suite)

JAPON

Summary Report on Present Tendencies in the Development of Mathematical Teaching in Japan[2].

(Extrait)

PREFACE. — *It was last autumn that an invitation was received in Tokyo from Professor Dr. Fehr, general secretary of the International Commission on the Teaching of Mathematics, asking for a Report on Present Tendencies in the Development of Mathematical Teaching in*

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[1] Voir le compte rendu de la Réunion d'Oslo dans *L'Ens. mathém.*, 35me année, 1936, p. 386-388.

[2] Le texte complet de ce *Summary Report*, rédigé par M. KUNIYEDA, a fait l'objet d'un fascicule de 49 pages imprimé par les soins de la Tokyo University of Literature and Science (mai, 1936).

Faisant suite à cet exposé sommaire, la délégation japonaise a publié un rapport plus complet intitulé:

Divisional Reports on Present Tendencies in the Development of Mathematical Teaching in Japan, prepared by the Japanese National Commission on the Teaching of Mathematics. — Un vol. in-8° de 174 p., Tokyo, 1936.

Japan for presentation before the International Congress of Mathematicians projected at Oslo for next July.

Following receipt of the invitation, Dr. Takagi, chief of the mathematical department of the National Research Council of Japan, entrusted the task of drafting the requested report to the present writer about the middle of last November.

The authorities of the Education Ministry had been approached on the matter and it was no earlier than early last January that the Japanese National Commission on the Teaching of Mathematics was appointed in the Tokyo Bunrika Daigaku (Tokyo University of Literature and Science) under the chairmanship of the present writer.

It seemed to be almost impossible to effect exhaustive enquiries necessary for the drawing up of the required report in so short a period as had been set before the Commission, which, however, set to work immediately, dividing the task among its members.

The following summary report is the outcome of what the chairman of the drafting committee has epitomized the draft reports submitted by various members of the Commission on the results of their respective enquiries. The original texts of the draft reports are separately bound up into the "Divisional Reports".

In view of those circumstances mentioned above, it is with considerable diffidence that the compiler sends in this Report, who looks forward to the sympathetic perusal of the reader irrespective of so many things left to be desired, in consideration of the shortness of the period fixed for the Commission to complete its task.

April, 1936. Motoji KUNIYEDA.

1. INTRODUCTION.

The movement for reforming the teaching of mathematics had not produced any tangible repercussions in Japan until the late Dr. R. Fujisawa published in 1912 two reports [1] on the teaching of mathematics in Japan for presentation to the general meeting of the International Commission on the Teaching of Mathematics.

Once the initiative having been taken by the late savant, the reform movement gradually gained strength in the country until at last in 1918 a Conference of All Japan Mathematical Teachers was convened at Tokyo for the purpose of discussing the principles of the reform movement. As a result of the conference, the Mathe-

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[1] These reports consist of

1. R. FUJISAWA, *Summary Report on the Teaching of Mathematics in Japan* (1912).
2. *Report on the Teaching of Mathematics in Japan.* Prepared by the Japanese Sub-Commission of the International Commission on the Teaching of Mathematics (1912).

These reports will be referred as the *Reports of* 1912 in the sequel.

matical Association of Japan for Secondary Education was inaugurated in the capital in 1919, which has since been rendering great services for the development of mathematical teaching in the Empire.

By virtue of the Higher School Law enacted in 1918, and the revised regulations relative to the enforcement of the Middle School Law and the administration of Normal Schools promulgated in 1931, considerable changes have been made in the program of mathematical teaching in the respective schools in accordance with the spirit of the reformist movement with the result that the mathematical teaching in the country has come into line with the general tendencies in the world.

An epoch-making adventure was initiated by the Japanese educational authorities last year in revising the state text-books for arithmetical teaching in Elementary Schools.

2. Existing School System in Japan.

In order to facilitate the reader's understanding of the conditions of mathematical teaching in various sorts of schools in Japan, a table of Japanese School System will be given.

The establishment in 1929 of Bunrika Daigaku (Universities of Literature and Science) in Tokyo and Hiroshima, capital of Hiroshima Prefecture, is also a recent educational installation in Japan, while the latest event was witnessed last year when the Law governing the establishment of Youths' School (Training Schools for Young Men and Women) was promulgated.

The Higher School course extends over seven years, of which the ordinary course is set for four years and the higher course for three years.

The Middle School course extends over five years, and those who have finished the fourth-year course are permitted to apply for admission to the higher course of the Higher School.

A school-calendar illustrating the outline of the school system in Japan is shown on the previous page.

3. Mathematical Teaching in Elementary Schools.

The subject for mathematical teaching in the elementary school is arithmetic.

Lesson-hours per week for arithmetical teaching in the elementary school are at present fixed as follows, one lesson-hour lasting for 45 minutes.

Ordinary Elementary School

	School year					
	I	II	III	IV	V	VI
Number of lesson hours per Week	5	5	6	6	4	4

Higher Elementary School

	School year		
	I	II	III
Number of lesson hours per Week	4	4	4

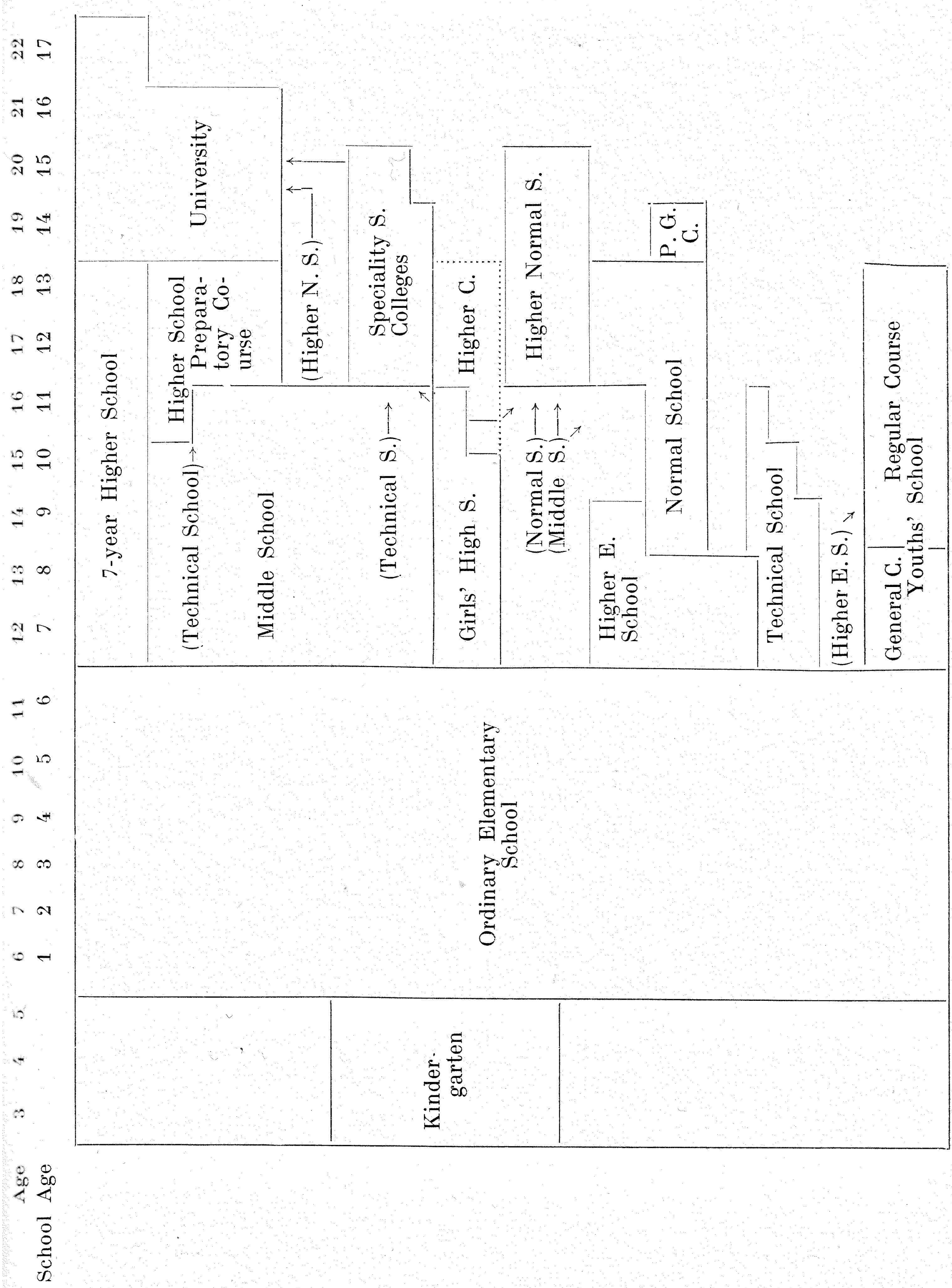
As has already been related in the Reports of 1912, it was in 1905 that State text-books for the mathematical teaching in elementary schools had been published for the first time in the educational history of the country. These text-books had been used without undergoing any substantial change for nearly 30 years.

In view of the recent tendencies, at once abroad and at home, of educational development, a substantial revision of arithmetical text-books has been attempted by the authorities of the Education Ministry in the hope to keep these books in line with the general developments made in the national life. It is pointed out that as a sequel to extensive enquiries conducted in various directions, a fundamental policy on which the projected revision should be carried out, has been established by the authorities of the Education Ministry.

It has been in pursuance of this policy that the first part of the arithmetical text-books for the use of the first year course of the ordinary elementary school was published in February, 1935, which was followed before long by the publication of the second part of the first-year text-book and the first part of the second year book.

The fundamental policy governing the present revision of the arithmetical text-books is reported to be along the following lines:

1. The main object in view is to cultivate children's thinking on the basis of mathematical principles.
2. The contents and their arrangement in the text-books should be made more suitable to the development of children.
3. The contents and their treatment should be kept in line with practical life.
4. The contents are expected to be imparted to the pupils as much through their personal experiences as possible.


Age
School Age
3
4
5
6 1
7 2
8 3
9 4
10 5
11 6
12 7
13 8
14 9
15 10
16 11
17 12
18 13
19 14
20 15
21 16
22 17
Kinder-garten
Ordinary Elementary School
7-year Higher School
University
Higher School Prepara-tory Co-urse
(Technical School)→
Middle School
(Higher N. S.)
(Technical S.)→
Speciality S. Colleges
Girls' High S.
Higher C.
(Normal S.)→
(Middle S.)→
Higher Normal S.
Higher E. School
Normal School
P. G. C.
Technical School
(Higher E. S.)
General C.
Regular Course
Youths' School

5. The text-book should be provided with greater flexibility in consideration of various circumstances prevailing in different parts of the country.
6. Text-books should be provided with greater facilities for actual instruction in class-rooms.
7. In text-books for children's use, facilities should be cultivated for the study of the pupils.
8. Text-books should be made more appellant to the interests of children.

In connection with the extent to which teaching materials should be provided in the text-books, the following points are taken into considerations:

1. Matters necessary for the fostering of mathematical ideas.
2. Matters administering to the development of children's minds and abilities.
3. The basic and common of matters applicable to practical life.
4. Matters necessary for civil education.

With regard to the arrangement of teaching materials in text-books specific considerations are paid on the following points:

1. Mathematical principles, which will form the underlying bases of the present revision, should be adjusted to the different stages of the mental development of children, to which will be added matters designed to meet systematically the progress of the pupils' minds.
2. To begin with concrete matters, which will be developed into general matters.
3. Teaching materials are expected to be developed along genetic principles as much as possible.
4. The initiation of new materials should start from such matters as would require solution by children themselves.
5. Considerations should be paid to the affecting of a smooth coordination between the old and the new materials.
6. Teaching materials should be classified into comparatively large categories.

As compared with the earlier ones, the revised text-books of arithmetic have undergone substantial changes in many points.

With due consideration being made for their practical application by individual teachers as well as for local circumstances and for the different abilities of children in regard to details of the methods, major principles concerning the methodical definition may be summed up as follows:

1. Such actual facts as would interest children and make them feel the need of these facts, or are likely to interest them and make them feel the need of these facts when they will meet with such

matters, should be presented inasmuch as these practical matters will provide motives for the development of mathematical ideas on the part of the children and, by encouraging voluntary learning activities, lead them to achieving the creation of personal experiences conforming to their respective abilities.

2. By means of analysis and synthesis of these personal experiences on the part of the pupils, general mathematical ideas should be developed systematically.

3. What has thus been acquired by the children of mathematical thought should be consolidated by repeated practices.

4. In addition, by making these acquirements applied to the settlement and disposal of actual questions facing the children, they should be developed into active faculties to meet practical life, which would constitute important factors in laying the foundation for the children to enter upon useful activities in the years to come both as an individual and as a citizen.

4. Mathematical Teaching in Middle Schools.

With the Outlined Program remaining intact for nearly 20 years, the initiative was taken in 1917 by those directly connected with mathematical education in the country in launching active movements for reforming mathematical teaching. The first definite indication of the reform move was seen towards the end of 1918 when a Conference of All Japan Mathematical Teachers was convened in Tokyo, which was followed shortly afterwards by the inauguration of the first annual general session of the Mathematical Association of Japan for Secondary Education.

The educational system for middle schools in Japan was revised in 1931 when the course of the middle school was divided into two categories, the First Kind of the Curriculum aiming at certain instruction of business subject and the Second Kind of the Curriculum being arranged mainly for the benefit of those who wish to prepare themselves for admission to higher-grade schools. The choice between the two categories is permitted to be made in accordance with the pupils' abilities, dispositions and wishes as well as local circumstances.

Main features of the new program are, among others, the division of the curriculum into the regular and the complementary studies, the adoption of unionist principle in construction, the importance attached to practical application in arranging the contents of each curriculum, and the preference given to intuitionalism in designing teaching methods. Various pending issues have thus been settled on this field of the secondary education and a new phase has been developed in the mathematical teaching in the country.

The revised outlined program provides for the number of lesson hours per week for mathematical teaching in middle schools.

Summing up the salient features of the present program of mathematical instruction and the effects it has produced, we may take note of the following points.

1. The appreciation of synthesis.

It has been in consideration of this principle that, instead of putting down the names of Arithmetic, Algebra, Geometry, Trigonometry and so on, only concrete items of these subjects are mentioned in this program. It is stated in the precautionary notes attached to the new program that the idea of function should be made the centre of synthetic practices.

2. Only major items have been shown in the program.

Arrangements in this connection have been calculated to remove pressure likely to be brought by any over-specified curriculum upon actual instruction as well as to prevent teaching formula from being standardized. With details of the teaching program left for compilation to the discretion of instructors and editors of text-books, the new outlined program, when proper use is made of it, is believed to accomplish much in the development of mathematical teaching in the country.

3. Practicability has been stressed.

Among other things indicative of the attention called to the selection of teaching materials such as would be most pertinent to actual requirements, the following three points may be pointed out in the new teaching plan.

(*a*) Instruction in algebra is made to center around equations and most of those difficult problems relating to mere formalities have been deleted.

(*b*) The introduction of numerical trigonometry has been expedied.

(*c*) Special regard has been paid to the fostering of functional ideas in children resulting in considerable increase in graphic materials.

4. Attention has been brought to the degrees of the development of pupils' capacities. A striking indication hereof will be seen in the insertion of Geometrical Figures in the geometrical stuff in the new program, which is chiefly to be dealt with through intuitional practices.

5. Mathematical Teaching in Girl's High Schools.

In 1920 the week hours for mathematical teaching in girls' high schools were revised. With the selection of teaching materials

left to the study of actual educators, the only step taken by the authorities concerned on the occasion was the enforcement of an official examination of text-books in an attempt to effect a control of the contents of school books. In view of these circumstances, the Mathematical Association of Japan for Secondary Education submitted for discussion a draft program of mathematical teaching in girls' high schools to the general meeting held in 1921. During the decade following, increasing need for a revision of the teaching plan was felt in order to keep the female education in line with general development in the country. In 1931, the Mathematical Association evolved following prolonged deliberations a draft revised system dividing the mathematical curriculum in girls' high schools into the regular and the complementary studies, which subsequently secured the adherence of most of the girls' schools in the country.

To sum up, the mathematical teaching in the higher ordinary education for females in the country has made a rapid progress during the past two decades. It is a notable feature of the mathematical education that, despite the distinct standards existing between the middle schools and the girls' high schools in the country in other courses of secondary education, the latter chiefly being aimed at the acquisition of matters necessary for domestic life, instruction in mathematics is leading the male and the female towards an indiscriminate field of education.

6. Mathematical Teaching in Technical Schools.

In the field of mathematical education, the initiative for setting forth a coordinated system has been taken by the Mathematical Association of Japan for Secondary Education, under whose auspieces various researches and inquiries have already been initiated during the past few years.

The contents of mathematical instruction in technological schools are practically the same as in middle schools. During the first, second and third years, algebra, plane geometry and trigonometrical functions of acute angles are taught: in the fourth year, solid geometry and trigonometrical functions of general angles are introduced: and in the fifth year, rudiments of advanced mathematics are brought in among the following lines:

Analytical Geometry: straight lines, conic sections.
Differential Calculus: limits, differential coefficients, maxima and minima, differentiation of transcendental functions, applications of differentiation.
Integral Calculus: indefinite integrals, definite integrals, differential equations.

7. Mathematical Teaching in Higher Schools.

By virtue of the reform of the educational system in the country enforced in 1918, the object of Higher Schools as preparatory schools for universities in the old system was changed into that of giving the higher ordinary education to young men. The following are the main points modified in the mathematical course on the occasion:

(1) In the earlier educational system which was put into force in 1912, mathematical instruction in the First Division of the Preparatory Course for Universities in the Higher School was given to those only who wish to apply for admission to the Philosophical Course of the Literature Faculty, whereas in the present Literature Course of the Higher School, which corresponds to the First Division of the Higher School in the earlier system, mathematics is taught to all students. The substance of instruction, however, remains almost the same as in the earlier system, with the lesson hours a week raised from two to three hours.

(2) The Second and Third Divisions of the Preparatory Course for Universities in the Higher School in the earlier system have been incorporated into the Science Course in the new system. There had been considerable differences in the earlier system between the grades, contents and lesson hours of the mathematical teaching of the Second Division preparatory to the Science and Technical Faculties and those of the Third Division preparatory to the Medical Faculty. In the present Science Course of the Higher School, however, the whole mathematical course is conducted on a coordinated program, irrespective of the desired courses of advanced study in universities. Those who wish to enter the Agricultural and the Medical Faculties are relieved of dynamics. The substance of mathematics taught in the Science Course of the Higher School in the new system is much the same as in the Second Division of the earlier system.

(3) Solid geometry is a new insertion in the new program for mathematical teaching in Higher Schools, while the elementary theory of numbers, the continued fractions, the indeterminate equations and others have been omitted from the algebra course, and the differential equations from the course of the differential and integral calculus.

Main items of the new outlined program follows:

Literature Course (Lesson hours in the first year total about 90): Supplements to algebra and geometry, Trigonometry, Plane analytical geometry, Differential and integral calculus.

Science Course: Solid geometry (about 20 hours), Trigonometry (about 40 hours), Analytical geometry (plane and solid about 70 hours), Algebra (about 60 hours), Differential and integral calculus (about 170 hours), Dynamics (about 60 hours).

8. Mathematical Teaching in Colleges and Speciality Schools.

Colleges and Speciality Schools in which mathematics is taught may, for convenience sake, be divided into those which make a speciality of mathematics and those which treat of mathematics as one of the fundamental courses. The former includes the mathematical course of the Tokyo Butsuri-Gakko, viz., the Tokyo Physics School and the Special Mathematical Course of the Woman's Christian College of Japan. The mathematical curriculum in these schools corresponds to that of the mathematical course of the Higher Normal School. The latter comprises the Higher Technological School, the Higher Polytechnical School, the Mining College, the Higher Agricultural and Forestry School, the Sericultural College, the Higher Fisheries School, the Nautical College, the Department of Physics and Chemistry of the Tokyo Physics School and the Department of Domestic Science of the Japan Women's College and the Osaka Special College for Women, etc. The mathematical curriculum for this latter group of schools follows on principle that of the Science Department of the Higher School with the following supplements on practical mathematics adopted according to special requirements: calculation with various numerical tables, nomography, statistical mathematics, the method of least squares and spherical trigonometry.

In comparing the latest developments in the mathematical teaching in these schools with those in the earlier years, the following points may be pointed out:

(1) Lessons in mathematics have been introduced in such courses as had formerly made little of this subject.

(2) With a view to facilitating the application of mathematics to other special courses, the whole outline of the calculus is taught in the junior classes.

(3) Such high-graded subjects as partial differential equations, integral equations, and Fourier Series have come to be inserted in the curriculum.

(4) Such subjects of the practical mathematics as graphical calculation, nomography, statistical mathematics and the method of least squares have also been introduced. It may be added that some of these speciality schools have been provided with mathematical laboratories.

(5) As a result of the insertion of such additional subjects, lesson hours for analytical geometry and algebra have been decreased.

9. Mathematical Teaching in Universities.

At the time when we presented our last Reports in 1912, there were no more than three universities in Japan where mathematical courses have been established, which included the Tokyo, the Kyoto and the Tôhoku Imperial Universities. There are, however, seven universities in the country at present including, the three mentioned above, the Hokkaido and the Osaka Imperial Universities and the Tokyo and the Hiroshima Bunrika Daigaku (Universities of Literature and Science), which are furnished with mathematical courses.

Before graduating at each university, students are required to study in the university for three years or more and pass examinations relating to a number of compulsory subjects and more than a certain number of optional subjects.

The following table shows the lists of compulsory and optional subjects of study in the mathematical course in the Tokyo Imperial University:

Compulsory Subjects	Fixed period of study (year)	Lesson hours per week	Exercise Number of sitting per week
Differential and integral calculus	1	4	1
Higher algebra	1	2	1
Higher geometry	1	3	1
Theory of functions	1	3	1
Theory of differential equations	1	3	1
Dynamics (Part I)	1	2	1
Special lectures on mathematics	1	2	
Mathematical seminary	1		1
Optional Subjects (Students are required to finish two or more (delete) of the following subjects)			
Higher algebra and number theory	1	3	1
Synthetic geometry and descriptive geometry	1	3	1
Theory of probability and statistics	1	2	1
Spherical astronomy and the method of least squares	1	3	
Celestial mechanics	1	3	
Dynamics (Part II)	1	2	
General physics	1	3	
Experiments on physics	1/2		2

10. Mathematical Teaching in Normal Schools.

I. *Normal Schools under the control of Prefectural Governments.*

The object of those normal schools which have been established and are maintained by Prefectural Governments in Japan is to train teachers for elementary schools. Marked reforms have been introduced at once in the number of school years and in the curricula of these normal schools under the revised regulations promulgated in 1925 and 1931. The first section of the regular course of the normal school takes in the graduates of the higher elementary school of two years' course, both male and female, and its course of study extends over five years. The second section of the regular course of the normal school takes in the graduates of middle schools and girls' high schools, with its course of study extending over two years. The post-graduate course of normal schools are designed to give higher educational attainments to the graduates of the regular course.

The object of mathematical teaching in normal schools is stipulated in the revised regulations of 1931 as the same governing that in secondary schools. The following gives an outline of the revised program of mathematical teaching in normal schools.

The First Section of the Regular Course.

First Year (4 hours per week).

Integers, decimal fractions, fractions, integral expressions, linear equations, fractional expressions, rectilinear figures, circles.

Second Year (3 hours per week).

Quadratic equations, fractional equations, proportion, similar figures.

Third Year (3 hours per week).

Progressions, logarithms, daily computations relating to percentage, trigonometrical functions.

Fourth Year (2 hours per week).

Planes and straight lines, polyhedrons, curved bodies, methods of teaching arithmetic in elementary schools.

Fifth Year (2 hours per week).

Synthetic review of what has been taught during the preceding years, inequalities, maxima and minima, conic sections, ellipsoid, and study of teaching materials for elementary schools.

Additional mathematical stuffs in the fourth and fifth years include supplements to regular teaching materials, permutations and combi-

nations, binomial theorem, probability, statistics, and theory of projection and perspectives. Lesson hours for these supplementary subjects per week range from 2 to 4 hours.

The Second Section of the Regular Course.

First Year (2 hours per week for males and 3 hours per week for females).

Progressions, logarithms, solid figures, trigonometrical functions, daily computations relating to percentage, methods of teaching arithmetic in elementary schools.

Second Year (2 hours per week).

Synthesis of the teaching materials already taught and supplements to them, inequalities, maxima and minima, conic sections, ellipsoid, and study of arithmetical teaching materials for elementary schools.

Additional stuffs for mathematical teaching in the first and second years of the second section of the regular course follow those for the fourth and fifth years of the first section of the regular course.

II. *Higher Normal Schools.*

The object of Higher Normal Schools is to train teachers of *intermediate schools*, viz., of normal schools, middle schools and girls' high schools.

The following table outlines the mathematical curriculum of the first section (viz., the Mathematical Course) of the Science Department of the Tokyo Higher Normal School.

School year			
I	II	III	IV
Arithmetic (2)	Algebra (2)	Algebra (3)	Differential and integral calculus (2)
Algebra (2)	Geometry (2)	Geometry (3)	Advanced calculus (4)
Geometry (3)	Analytical geometry (3)	Differential and integral calculus (4)	Study of mathematical teaching (3)
Trigonometry (2)	Differential and integral calculus (4)	Exercise in algebra (2)	Applied mathematics (2)
Analytical geometry (2)	Exercise in algebra (2)	Exercise in geometry (2)	Exercise in mathematics (2)
Total hours per week 11	13	14	13

The bracketed figures show the number of lesson hours per week. A period of about two months in the third term of the fourth year is devoted to practical exercises in mathematical teaching in the middle and elementary schools attached to the Higher Normal School.

III. *Higher Normal Schools for Women.*

The following table shows an outline of the mathematical curriculum of the Science Department of the Tokyo Higher Normal School for Women.

School year			
I	II	III	IV
Algebra (2) Geometry (2) Trigonometry (1)	Algebra (2) Geometry Analytical geometry (3)	Elements of calculus (3)	Arithmetic and miscellanies in mathematics (4) Methods of mathematical teaching (1)
Total hours per week 5	5	3	5

Teaching program for optional course of mathematics.

	School year	
	III	IV
Algebra . . .	Algebra and theory of numbers (2)	Algebra and theory of equations (2)
Geometry . .	Plane and solid analytical geometry (2)	Projective and descriptive geometry (2)
Differential and integral calculus . .		Differential and integral calculus. Differential equations Elements of theory of functions (6)
Dynamics . .		(2)
Exercises . .	Elementary algebra and geometry (2)	(1)
Total hours per week .	6	13

The third term of the fourth year is likewise devoted to practical exercises in mathematical teaching.

11. Training of Mathematical Teachers.

(1) *Mathematical Instructors of Higher-Grade Schools.*

Those who complete the mathematical courses of the Bunrika Daigaku or of the Science Faculties of the Tokyo, the Kyoto, the Tôhoku, the Hokkaido and the Osaka Imperial Universities, are given qualifications without examination to instruct in mathematics in Higher Schools, Colleges and Speciality Schools. The examination for the license of higher school mathematical teachers is held by the Education Ministry once in a few years.

(2) *Mathematical Teachers of Intermediate Schools.*

As has previously been mentioned, the Government is actively co-operating in the training of mathematical teachers of intermediate schools. Those organs for training intermediate school teachers of mathematics which are under the direct control of the Education Ministry include the Bunrika Daigaku, the Higher Normal School and the Higher Normal School for Women. Teacher's licenses for middle-graded mathematics comprise those granted on examinations and those furnished without examination. Although a private establishment, the Tokyo Physics School is entitled to grant licenses without examination to its graduates of the mathematical course.

Qualifications to be instructors in mathematics in intermediate schools are also accorded on application without examination to those who have studied a fixed number or more of subjects on mathematics in the Faculties of Science, Technology and Agriculture of the Imperial University and also to those who have concluded the study of a sufficient number of mathematical subjects in the technical universities and certain technical colleges.

The examination for the license of mathematical teachers in the intermediate schools is held once a year by the Education Ministry. By the time of the presentation of the Reports of 1912, the subjects of mathematics for this teacher's license examination were confined to the four courses of (1) arithmetic, algebra, geometry, (2) trigonometry, (3) analytical geometry, (4) differential and integral calculus, each of which had been examined in a separate sitting. But at present they are examined all as one with no gradings since 1921, materials being taken from arithmetic, algebra, geometry, trigonometry and the rudiments of the higher mathematics. The higher mathematics in this case include the analytical geometry and the differential and integral calculus. The course of the teacher's license examination for mathematics of intermediate school grade consists

of the preliminary and the main courses, which latter comprises oral examination and tests on teaching methods. The number of the successful examinees in 1935 is put at 20.

12. Societies, Associations and Publications Concerning Mathematics.

Representative societies and associations with regard to mathematics in Japan include: (1) The Physico-Mathematical Society of Japan created in 1877; (2) Japanese Association for the Advancement of Science created in 1925; (3) The Mathematical Association of Japan for Secondary Education created in 1919; and (4) Japan Federation of Arithmetical Teaching created in 1933.

Periodical publications concerning pure mathematics and teaching of mathematics comprises the following:

Proceedings of the Physico-Mathematical Society of Japan (started in 1877).

The Tôhoku Mathematical Journal (started in 1911).

Japanese Journal of Mathematics (started in 1924).

Tokyo Butsurigakko Zassi (started in 1892).

The Journal of the Mathematical Association of Japan for Secondary Education (started in 1919).

Gekkan Sûgaku (started in 1934).

Studies on Higher Mathematics (started in 1930).

Sûgaku Kyôiku (started in 1930).

Gakkô Sûgaku (started in 1930).

La Edkado Aritmetika (started in 1923).

13. Conclusion.

In conclusion, it may be said that despite the fact that Japan seemed to have been left some time in the past about 20 years behind the European and American nations in starting the movement for reforming mathematical teaching, she has made steady progress in this direction since 1918 until at last at the present time Japan may take pride in being devoted to assiduous studies on mathematical teaching, keeping her position on the foremost front of the mathematical education in the world and yet without being affected by the reactionary thought prevailing in various parts of the world.

M. Kuniyeda.